

# Smolt Migration 2006

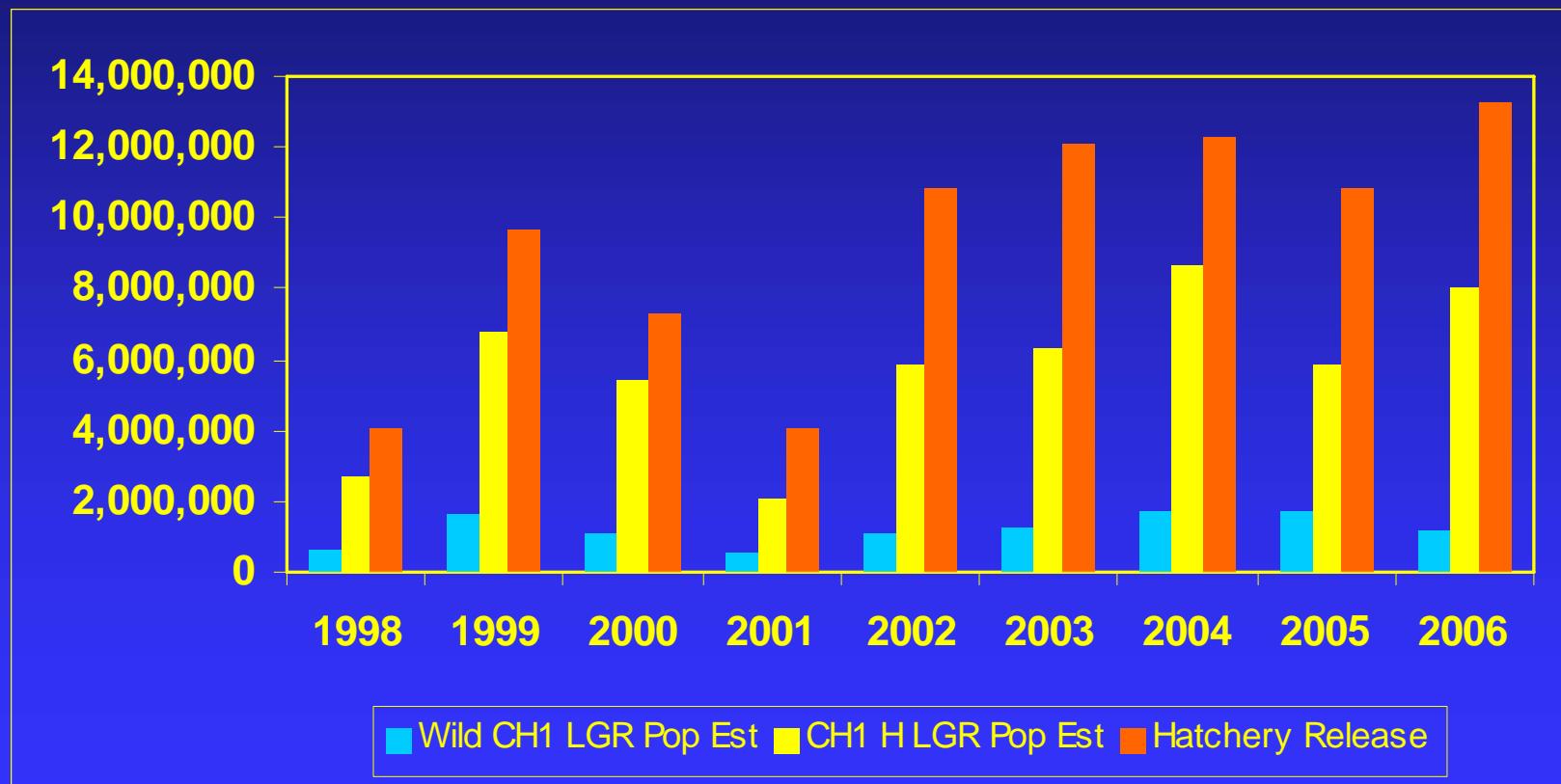
(preliminary results)

Fish Passage Center

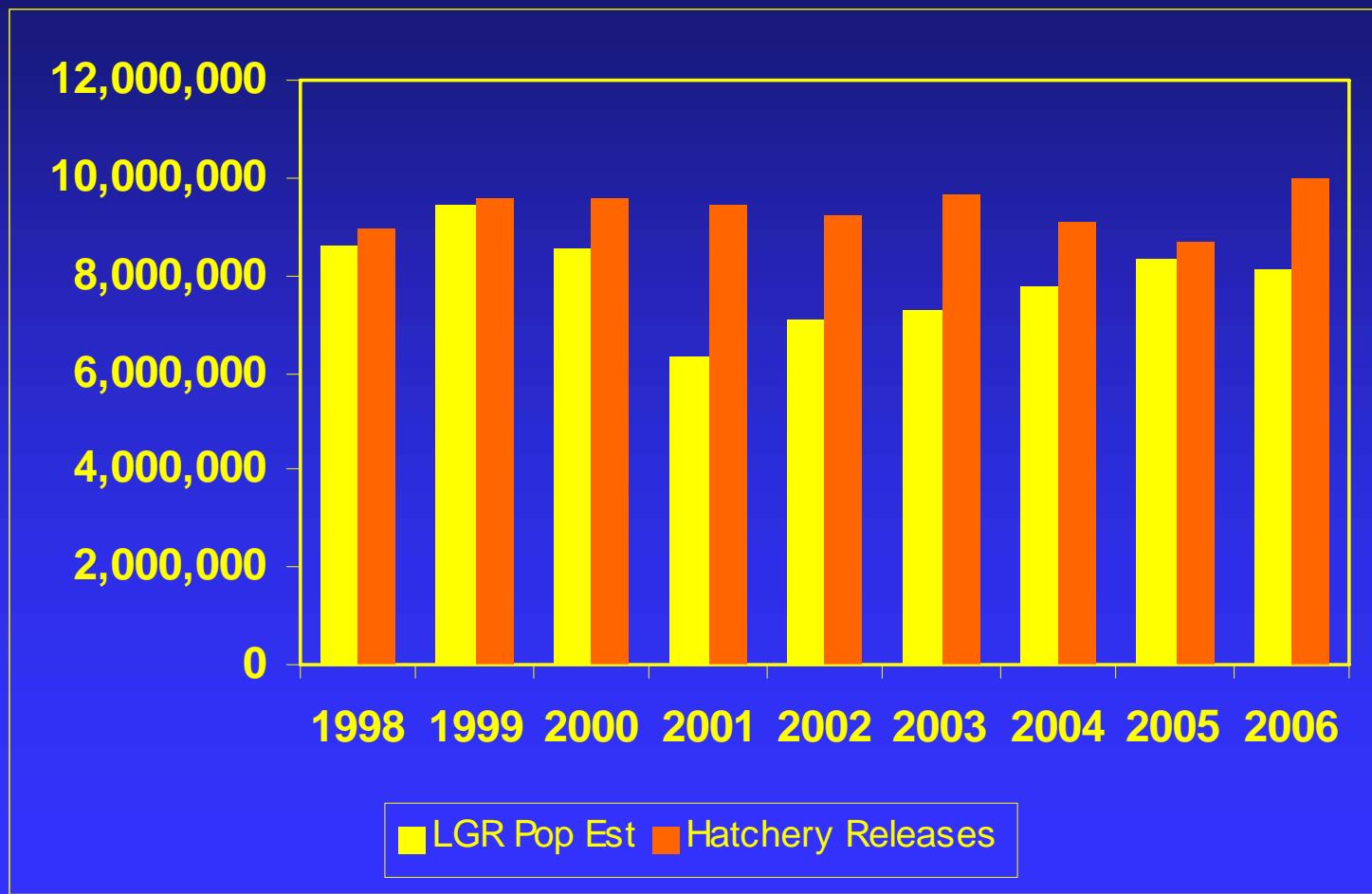
# Review of 2006 Smolt Migration

- Run Size
- Timing
- Spread-the-risk delayed transport
- Subyearling survival & summer spill

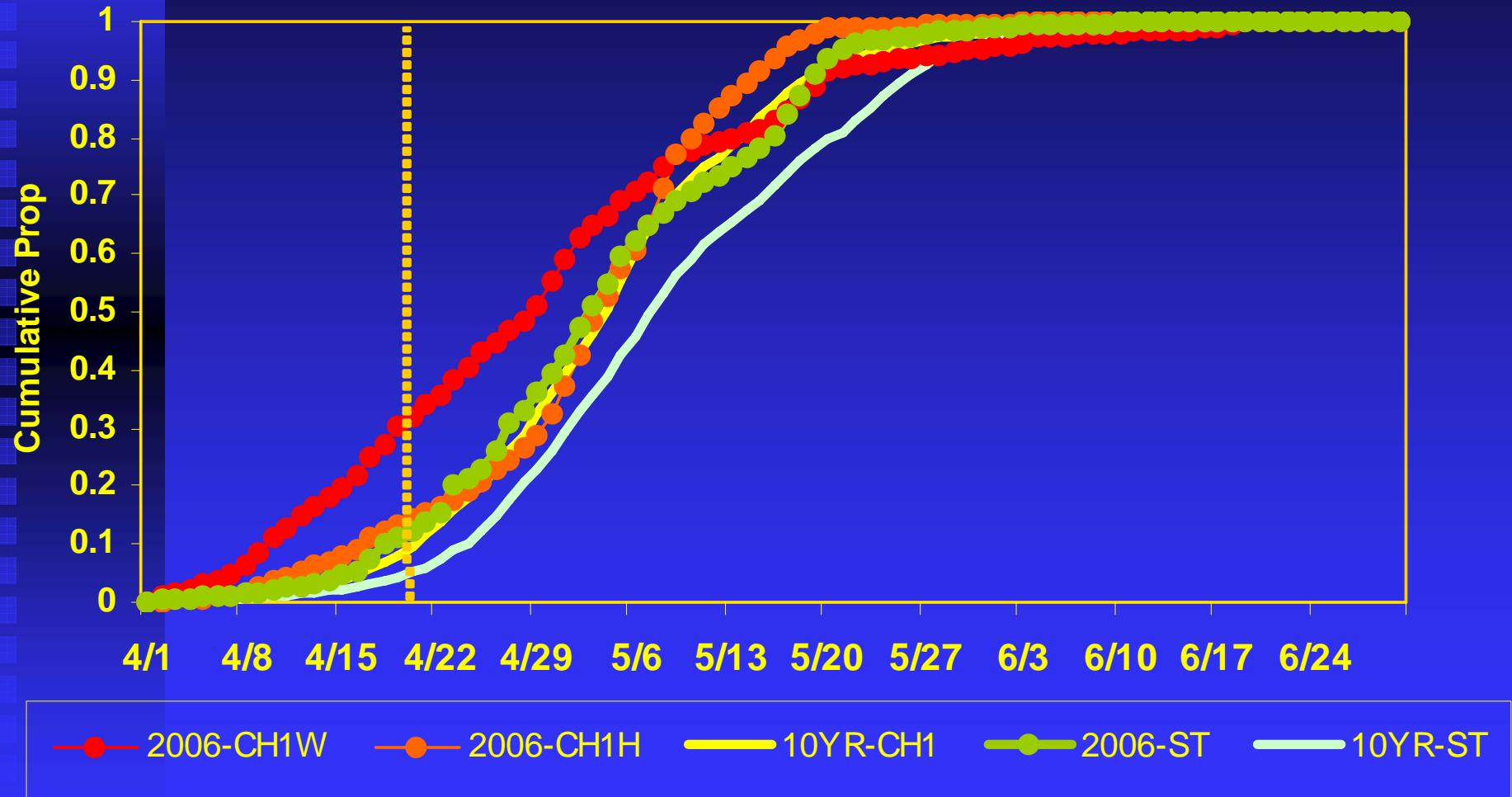
# Yearling Chinook Population Index at Lower Granite and Hatchery Releases



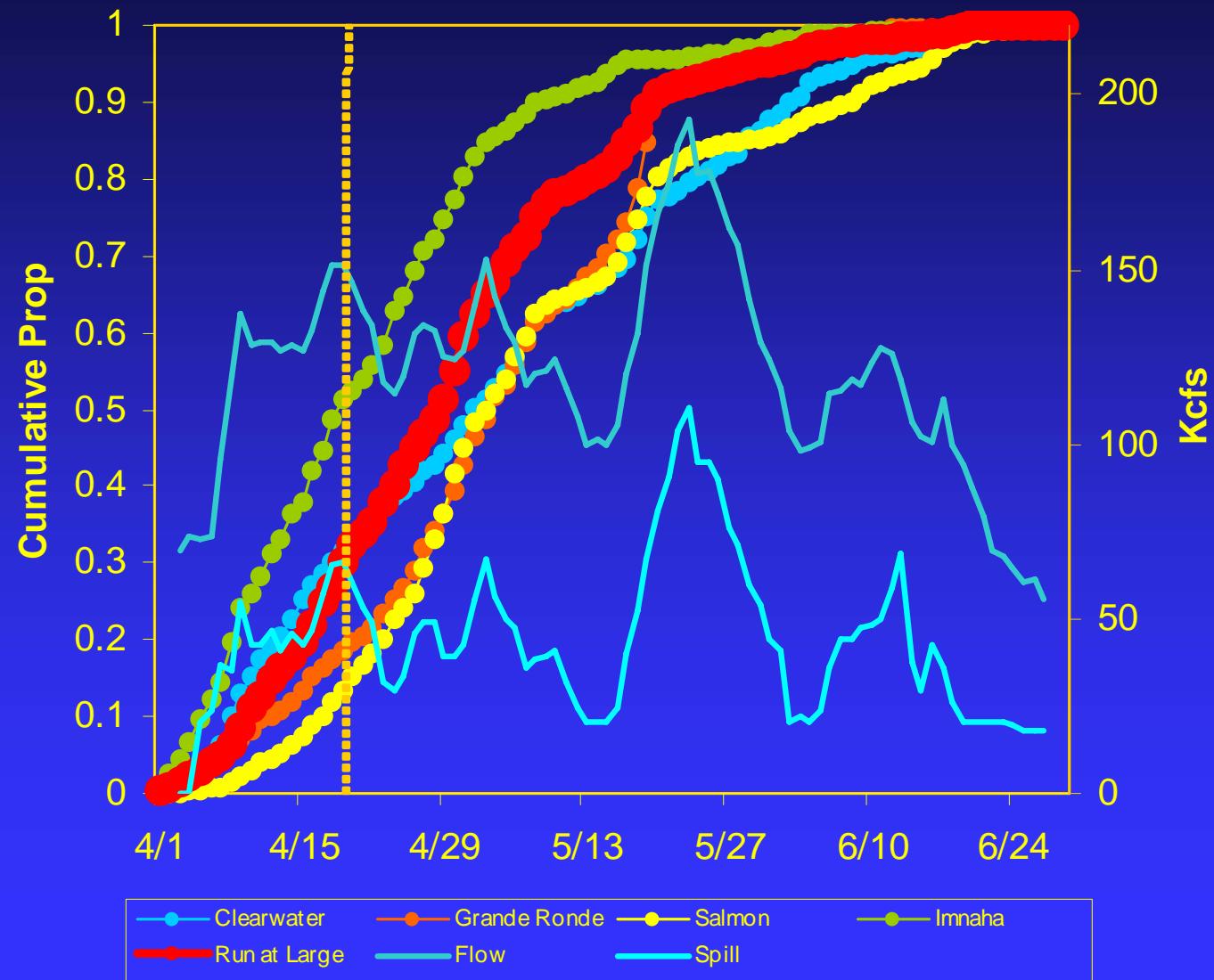
# Combined H&W Steelhead Population at Lower Granite and Hatchery Releases



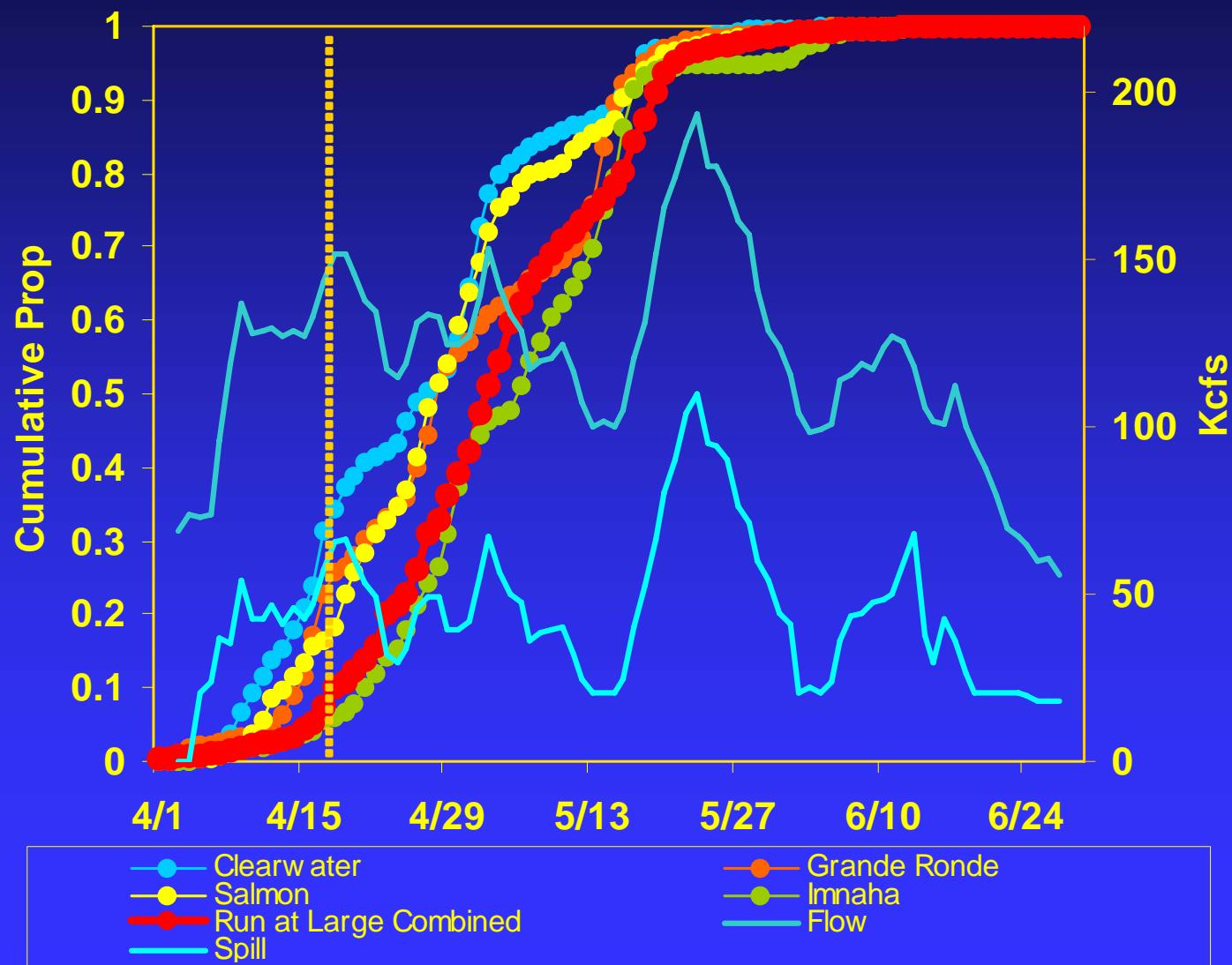
# Timing of Spring Migrants at Lower Granite



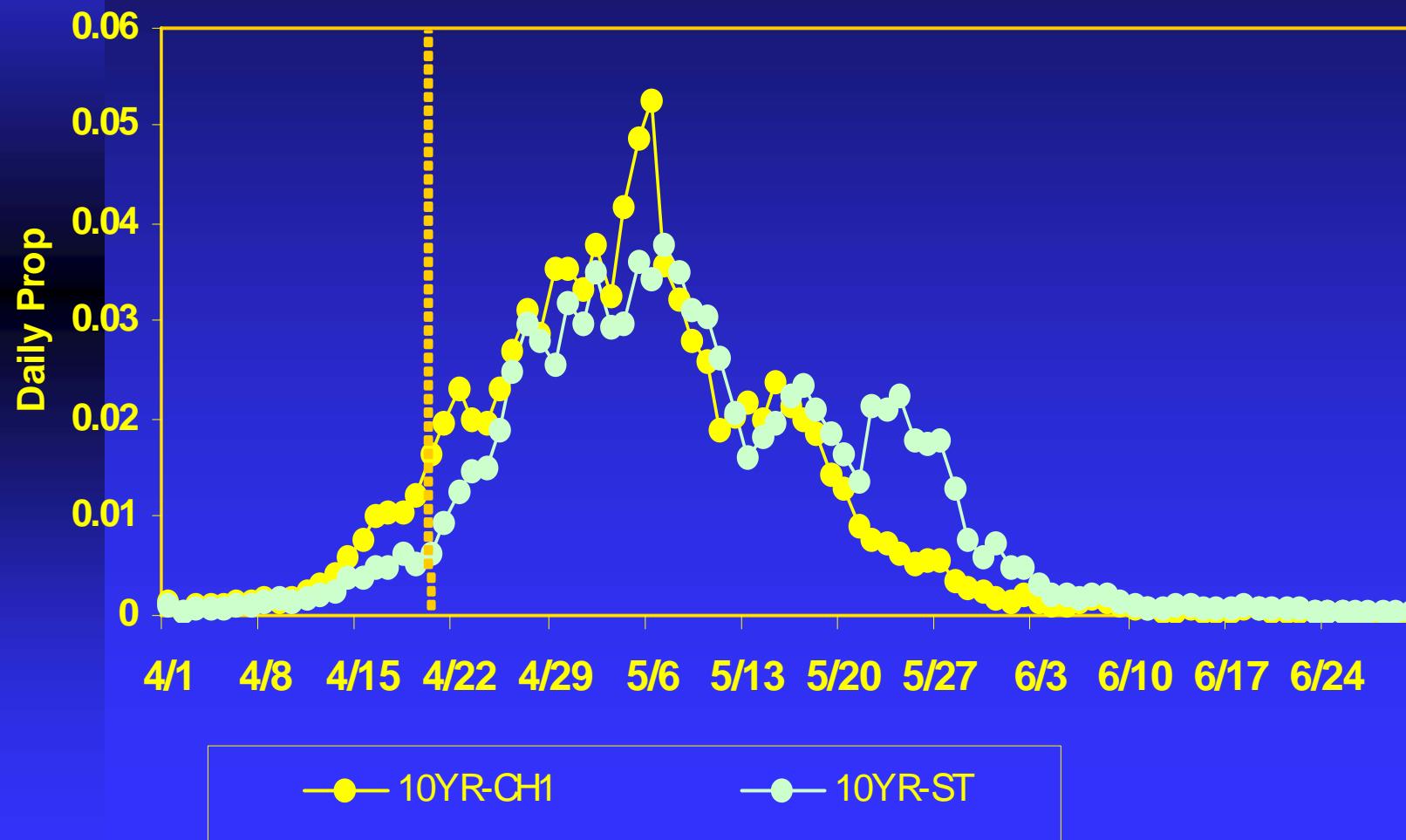
# Wild PIT-tagged Yearling Chinook Timing at LGR and wild run at large



# Wild PIT-tag Steelhead Timing at Lower Granite and Combined run at large



# Run at Large ST & CH 10Yr Avg Timing at LGR



# Summary of 2006 Transport

Species	Proportion Passing During Transport	Estimated Collection Efficiency				Proportion of Pop transport P(T)
		LGR	LGS	LMN	MCN	
<b>Wild Steelhead</b>	<b>0.87<sup>a</sup></b>	<b>0.37</b>	<b>0.66</b>	<b>0.61</b>	na	<b>0.79</b>
<b>Hatchery Steelhead</b>	<b>0.87<sup>a</sup></b>	<b>0.35</b>	<b>0.62</b>	<b>0.53</b>	na	<b>0.76</b>
<b>Wild Sp/Su Chinook</b>	<b>0.68</b>	<b>0.32</b>	<b>0.58</b>	<b>0.5</b>	na	<b>0.58</b>
<b>Hatch Sp/Su Chinook</b>	<b>0.86</b>	<b>0.24</b>	<b>0.42</b>	<b>0.35</b>	na	<b>0.61</b>
<b>Wild fall Chinook (subs)</b>	(1)	<b>0.16</b>	<b>0.3</b>	<b>0.12</b>	<b>0.21</b>	<b>0.59</b>
<b>Hatch fall Chinook (subs)</b>	1	<b>0.16</b>	<b>0.32</b>	<b>0.18</b>	<b>0.17</b>	<b>0.61</b>

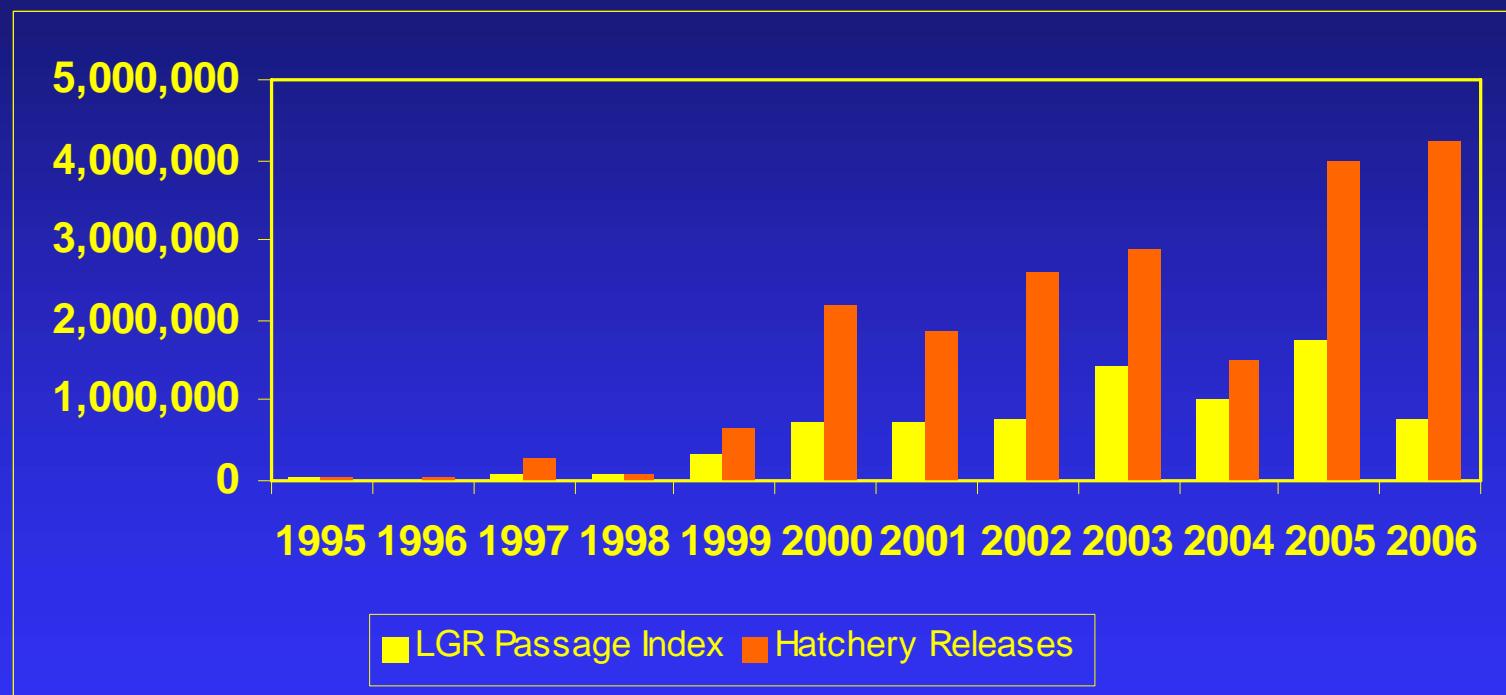
■  $P(T) = [CE_{lgr} + CE_{lgs} * (1-CE_{lgr}) + CE_{lmn} * (1-CE_{lgs})(1-CE_{lgr})] * Prop(Pop)$

# Other ways to measure transport proportion

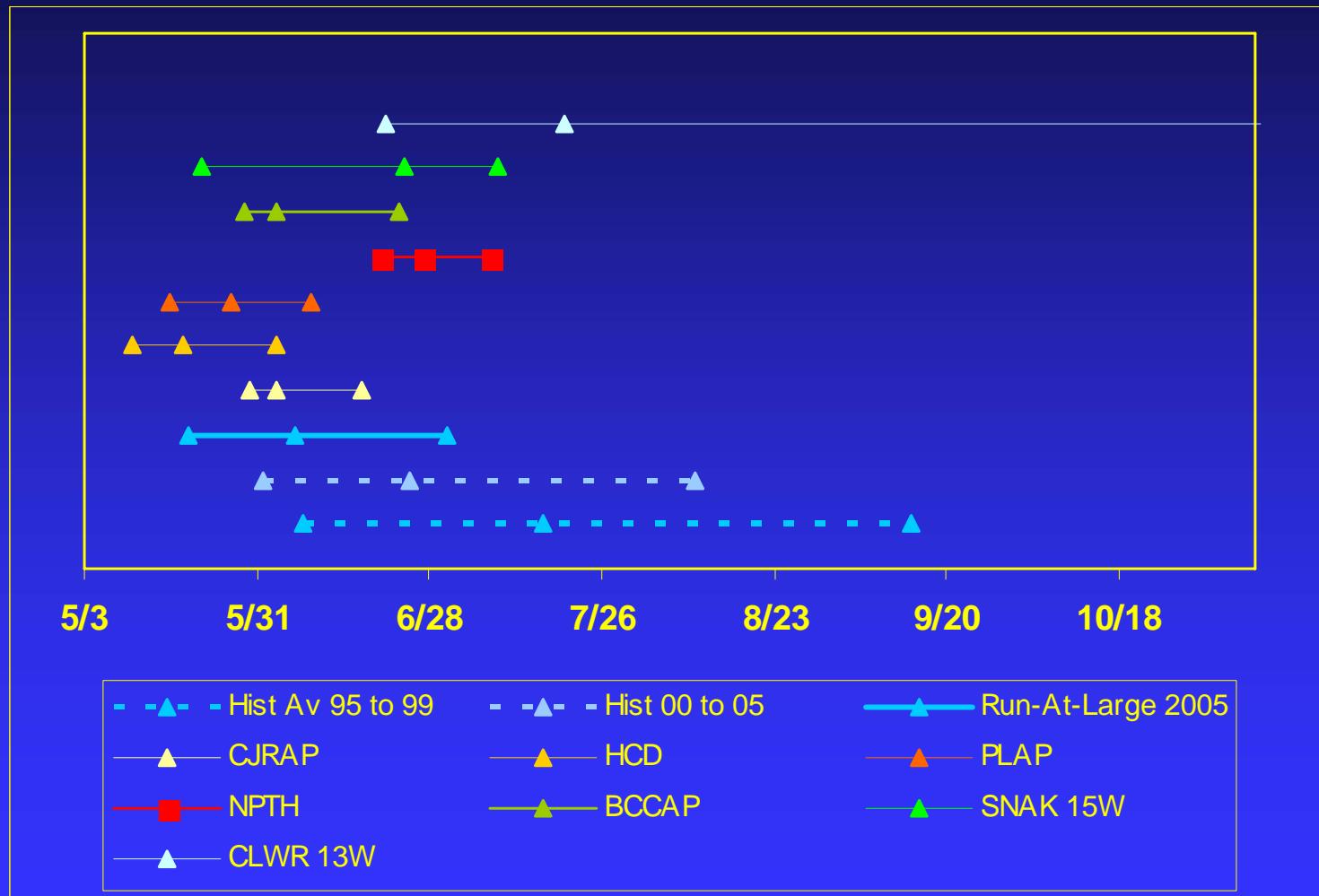
Species	Prop Pop Passing During Transport Prop(Pop)	Overall Prob of transport P(T)	Prob of transprt (Destin- ed) P(t)	Prob of passing uncollected P(Unc)	In-River Prop Below LMN P(InRiv)	In-Trans Prop Below LMN P(Tran)	InRiver Prop Bypassed P(Byp) (pct of InRiv)
<b>Wild Steelhead</b>	<b>0.87<sup>a</sup></b>	<b>0.79</b>	<b>0.92</b>	<b>0.08</b>	<b>0.17</b>	<b>0.77</b>	<b>0.12(69%)</b>
<b>Hatchery Steelhead</b>	<b>0.87<sup>a</sup></b>	<b>0.76</b>	<b>0.88</b>	<b>0.12</b>	<b>0.20</b>	<b>0.74</b>	<b>0.11(58%)</b>
<b>Wild Sp/Su Chinook</b>	<b>0.68</b>	<b>0.58</b>	<b>0.86</b>	<b>0.14</b>	<b>0.32</b>	<b>0.55</b>	<b>0.27(85%)</b>
<b>Hatch Sp/Su Chinook</b>	<b>0.86</b>	<b>0.61</b>	<b>0.71</b>	<b>0.29</b>	<b>0.28</b>	<b>0.57</b>	<b>0.09(32%)</b>
<b>Wild fall Chinook (s)</b>	<b>(1)</b>	<b>0.59</b>	<b>0.59</b>	<b>0.41</b>			
<b>Hatch fall Chinook (s)</b>	<b>1</b>	<b>0.61</b>	<b>0.61</b>	<b>0.39</b>			

- $P(T) = P(t) * \text{Prop}(Pop)$
- $P(t) = CE_{lgr} + CE_{lgs} * (1-CE_{lgr}) + CE_{lmn} * (1-CE_{lgs})(1-CE_{lgr})$
- $P(Unc) = (1-CE_{lgr})(1-CE_{lgs})(1-CE_{lmn})$
- $P(\text{InRiv}) = \text{Prop}(Pop) * [P(\text{Unc}) * S_{lgs} * S_{lmn}] + (1-\text{Prop}(pop)) * S_{lgs} * S_{lmn}$
- $P(\text{Tran}) = \text{Prop}(Pop) * [CE_{lgr} + CE_{lgs} * (1-CE_{lgr}) * S_{lgs} + CE_{lmn} * (1-CE_{lgs})(1-CE_{lgr}) * S_{lgs} * S_{lmn}]$
- $P(\text{Byp}) = [CE_{lgr} + S_{lgs} * CE_{lgs} * (1-CE_{lgr}) + S_{lmn} * CE_{lmn} * (1-CE_{lgs})(1-CE_{lgr})] * (1-\text{Prop}(Pop))$

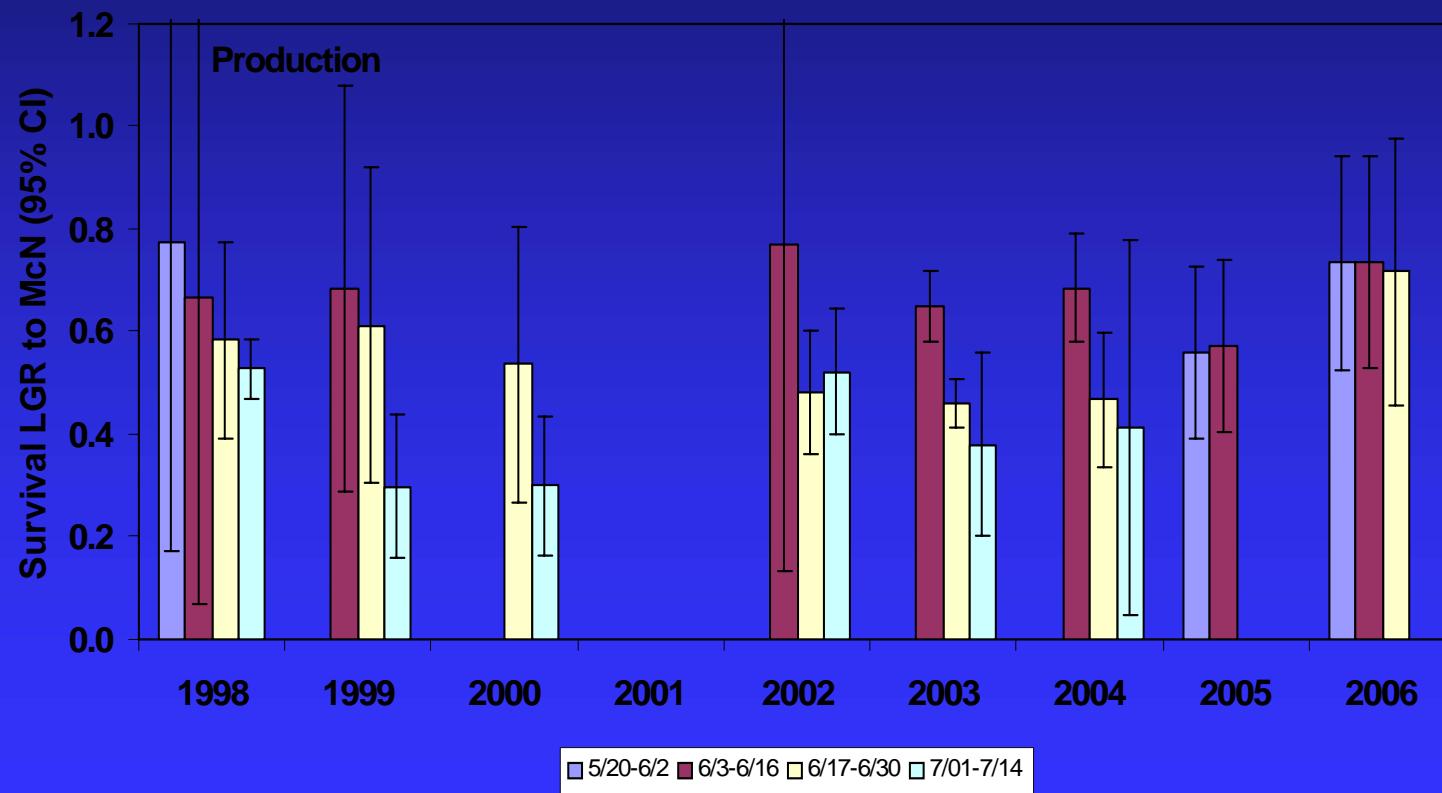
# Hatchery/Supplementation Releases of Subyearling Chinook above LGR



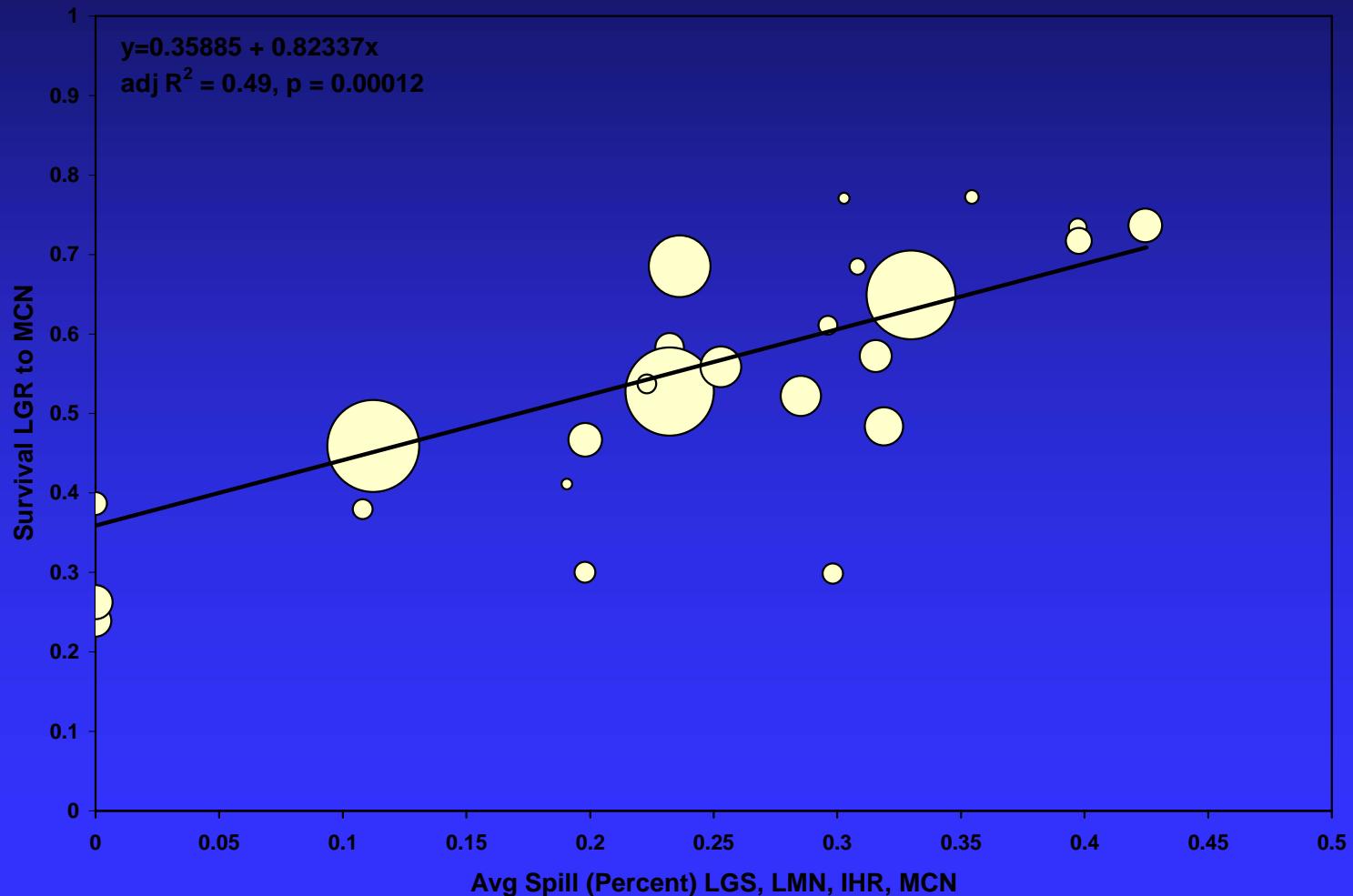
# Subyearling Chinook Timing at LGR



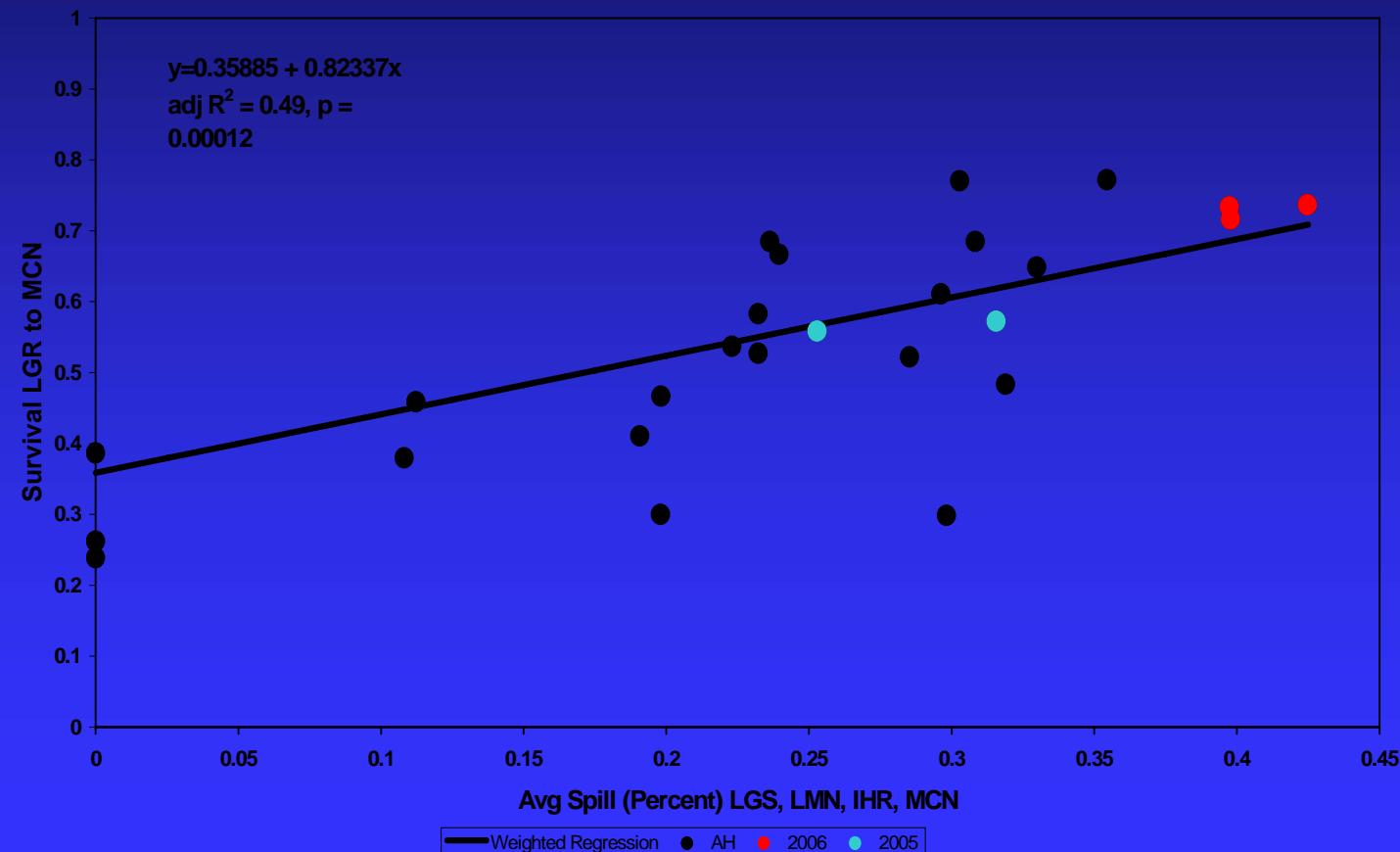
# Survival for Production Subyearling Chinook LGR to McN 1998 to 2006 with 95% CI's



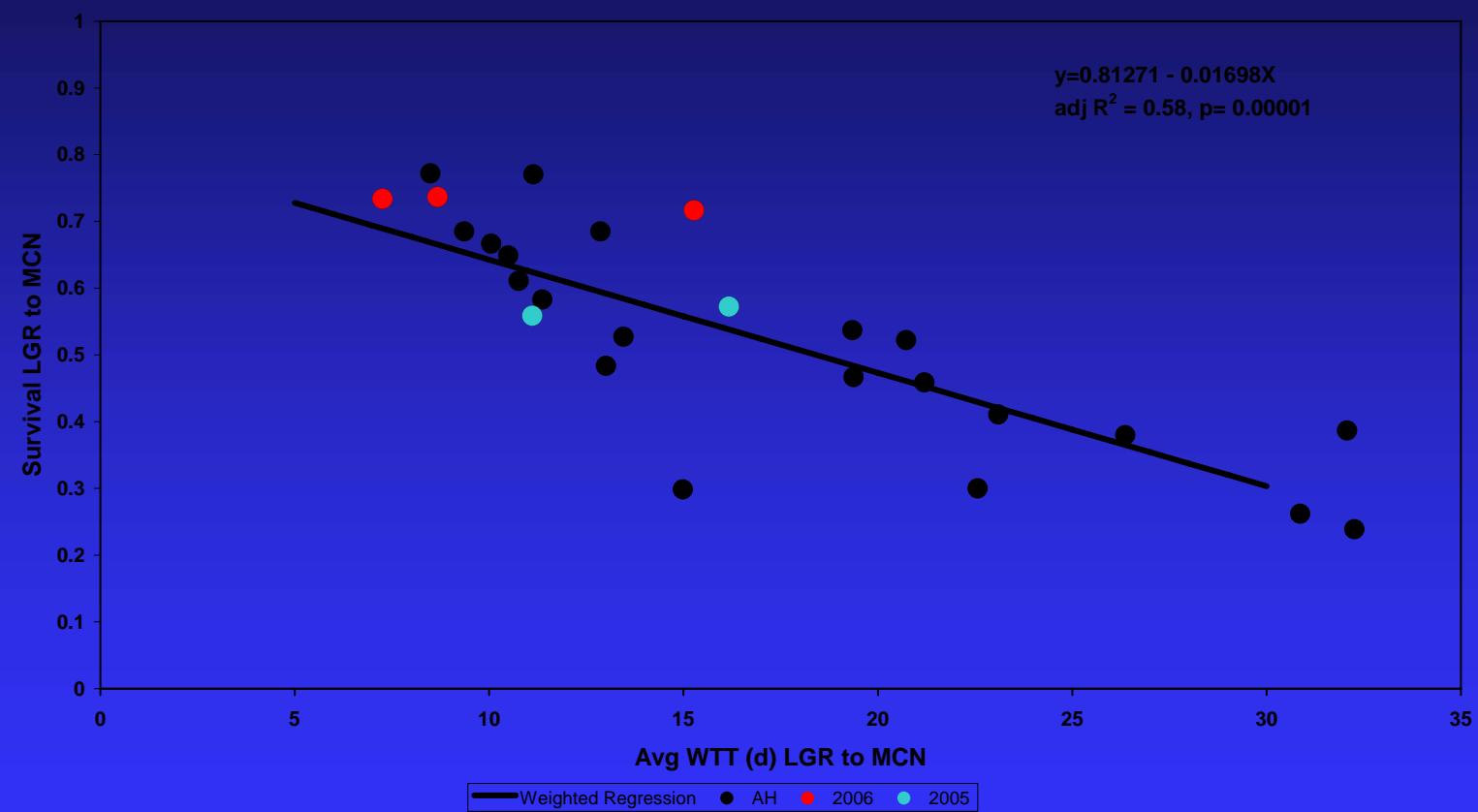
# Weighted Regression example



# AH Subyearling Chinook Survival vs Avg Spill Pct LGS, LMN, IHR, McN



# AH Subyearling Chinook Survival vs sum WTT LGS, LMN, IHR, McN



# AH Subyearling Chinook Survival vs Avg Temp LGS, LMN, IHR, McN

